

IN THE CLAIMS

✓ Please cancel claims 1-16, and add claims 17-37 as directed below. (The claims have been amended in the manner dictated by 37 C.F.R. §1.121(c)(1). Because claims have only been added or canceled herein, pursuant to 37 C.F.R. §1.121(c)(1)(ii) no marked up version of the added and canceled claims is provided herewith.)

17. (New) A coil interface for coupling a phased array coil system to a host magnetic resonance imaging (MRI) system, said phased array coil system having a plurality of coil elements, said host MRI system having a number of receiver channels for receiving magnetic resonance (MR) signals, said coil interface comprising:

(a) a plurality of input ports adapted to be coupled to said plurality of coil elements;

(b) a plurality of output ports adapted to be coupled to said receiver channels of said host MRI system; and

(c) an interface circuit for selectively interconnecting at least two of said input ports to at least one of said output ports and thereby allowing said phased array coil system to be selectively operated through said host MRI system in any one of a plurality of operational modes during an MRI scanning procedure.

18. (New) The coil interface recited in claim 17 wherein said interface circuit allows the operational mode in which said phased array system is operating to be remotely changed.

19. (New) The coil interface recited in claim 18 wherein said interface circuit includes a combiner circuit for at least one of said coil elements for remotely switching said phased array coil system between said operational modes, said combiner circuit comprising at least one remotely operable PIN diode switch and a 90 degree phase shifting circuit.

20. (New) The coil interface recited in claim 18 wherein said interface circuit includes at least one PIN diode switch operable from a console of said host MRI system for switching said phased array coil system between said operational modes.

21. (New) The coil interface recited in claim 17 wherein said plurality of coil elements includes a quadrature coil element, a spine coil element, a first neck coil element and a second neck coil element, said plurality of input ports including:

(a) a first input port for receiving an in-phase signal from said quadrature coil element;

(b) a second input port for receiving a quadrature signal from said quadrature coil element;

(c) a third input port for receiving a spine signal from said spine coil element;

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(d) a fourth input port for receiving a first neck signal from said first neck coil element; and

(e) a fifth input port for receiving a second neck signal from said second neck coil element;

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wherein in a first of said operational modes said interface circuit interconnects (i) said first and said second input ports to a first of said output ports; (ii) said third input port to a second of said output ports; (iii) said fourth input port to a third of said output ports; and (iv) said fifth input port to a fourth of said output ports.

22. (New) The coil interface recited in claim 21 wherein said in-phase and said quadrature signals received by said first and said second input ports, respectively, are phase shifted relative to one another before being combined and applied to said first output port.

23. (New) The coil interface recited in claim 17 wherein said plurality of coil elements includes a quadrature coil element, said plurality of input ports including:

(a) a first input port for receiving an in-phase signal from said quadrature coil element; and

(b) a second input port for receiving a quadrature signal from said quadrature coil element;

wherein in a second of said operational modes said interface circuit interconnects (i) said first input port to one of said output ports and (ii) said second input port to an other of said output ports, thereby allowing said in-phase signal to be applied to said one output port and said quadrature signal to be applied to said other output port.

24. (New) The coil interface recited in claim 17 wherein said plurality of coil elements includes a quadrature coil element, said plurality of input ports including:

(a) a first input port for receiving an in-phase signal from said quadrature coil element; and

(b) a second input port for receiving a quadrature signal from said quadrature coil element;

wherein in a third of said operational modes said interface circuit interconnects said first and said second input ports to a first of said output ports with said in-phase and said quadrature signals received by said first and said second input ports, respectively, being phase shifted relative to one another before being combined and applied to said first output port.

25. (New) The coil interface recited in claim 17 wherein said plurality of coil elements includes a spine coil element, a first

neck coil element and a second neck coil element, said plurality of input ports including:

(a) a first input port for receiving a spine signal from said spine coil element;

(b) a second input port for receiving a first neck signal from said first neck coil element; and

(c) a third input port for receiving a second neck signal from said second neck coil element;

wherein in a sixth of said operational modes said interface circuit interconnects (i) said first input port to a first of said output ports thereby allowing said spine signal to be applied to said first output port; (ii) said second input port to a second of said output ports thereby allowing said first neck signal to be applied to said second output port; and (iii) said third input port to a third of said output ports thereby allowing said second neck signal to be applied to said third output port.

26. (New) The coil interface recited in claim 17 wherein said plurality of coil elements includes a spine coil element and a neck coil element, said plurality of input ports including:

(a) a first input port for receiving a spine signal from said spine coil element; and

(b) a second input port for receiving a neck signal from said neck coil element;

wherein in a sixth of said operational modes said interface circuit interconnects (i) said first input port to a first of said output ports thereby allowing said spine signal to be applied to said first output port; and (ii) said second input port to a second of said output ports thereby allowing said first neck signal to be applied to said second output port.

27. (New) The coil interface recited in claim 17 wherein said plurality of coil elements includes a quadrature coil element capable of providing an in-phase signal and a quadrature signal, said plurality of input ports including:

(a) a first input port for receiving said in-phase signal from said quadrature coil element; and

(b) a second input port for receiving said quadrature signal from said quadrature coil element;

wherein said interface circuit is switchable between interconnecting (i) said first and said second input ports to one of said output ports with said in-phase and said quadrature signals being phase shifted relative to one another, combined and applied to said one of said output ports; and (ii) said first and said second input ports, and applying said in-phase and said quadrature signals received respectively thereby to a first and a second of said output ports, respectively.

28. (New) The coil interface recited in claim 17 wherein a conductive path through said interface circuit between any one of said plurality of input ports and any one of said plurality of output ports has an electrical length that is approximately equal to an integer multiple of half wavelengths.

29. (New) A method of operating a phased array coil system in a plurality of operational modes, said phased array coil system having a plurality of coil elements capable of operating with a host magnetic resonance imaging (MRI) system during an MRI scanning procedure, said method comprising the steps of:

(a) providing an interface circuit that has (i) a plurality of input ports for coupling to said plurality of coil elements and (ii) a plurality of output ports for coupling to a number of receiver channels of said host MRI system; and

(b) remotely configuring said interface circuit to selectively interconnect at least two of said input ports to at least one of said output ports, thereby allowing said phased array coil system to be selectively operated through said host MRI system in any one of said plurality of operational modes during said MRI scanning procedure.

30. (New) The method recited in claim 29 wherein said plurality of coil elements includes a quadrature coil element, a

spine coil element, a first neck coil element and a second neck coil element, said plurality of input ports including:

(a) a first input port for receiving an in-phase signal from said quadrature coil element;

(b) a second input port for receiving a quadrature signal from said quadrature coil element;

(c) a third input port for receiving a spine signal from said spine coil element;

(d) a fourth input port for receiving a first neck signal from said first neck coil element; and

(e) a fifth input port for receiving a second neck signal from said second neck coil element;

wherein in a first of said operational modes said interface circuit interconnects (i) said first and said second input ports to a first of said output ports; (ii) said third input port to a second of said output ports; (iii) said fourth input port to a third of said output ports; and (iv) said fifth input port to a fourth of said output ports.

31. (New) The method recited in claim 29 wherein said plurality of coil elements includes a quadrature coil element, said plurality of input ports including:

(a) a first input port for receiving an in-phase signal from said quadrature coil element; and

(b) a second input port for receiving a quadrature signal from said quadrature coil element;

wherein in a second of said operational modes said interface circuit interconnects (i) said first input port to one of said output ports and (ii) said second input port to an other of said output ports, thereby allowing said in-phase signal to be applied to said one output port and said quadrature signal to be applied to said other output port.

32. (New) The method recited in claim 29 wherein said plurality of coil elements includes a quadrature coil element, said plurality of input ports including:

(a) a first input port for receiving an in-phase signal from said quadrature coil element; and

(b) a second input port for receiving a quadrature signal from said quadrature coil element;

wherein in a third of said operational modes said interface circuit interconnects said first and said second input ports to a first of said output ports with said in-phase and said quadrature signals received by said first and said second input ports, respectively, being phase shifted relative to one another before being combined and applied to said first output port.

33. (New) The method recited in claim 29 wherein said plurality of coil elements includes a spine coil element, a first neck coil element and a second neck coil element, said plurality of input ports including:

(a) a first input port for receiving a spine signal from said spine coil element;

(b) a second input port for receiving a first neck signal from said first neck coil element; and

(c) a third input port for receiving a second neck signal from said second neck coil element;

wherein in a sixth of said operational modes said interface circuit interconnects (i) said first input port to a first of said output ports thereby allowing said spine signal to be applied to said first output port; (ii) said second input port to a second of said output ports thereby allowing said first neck signal to be applied to said second output port; and (iii) said third input port to a third of said output ports thereby allowing said second neck signal to be applied to said third output port.

34. (New) The method recited in claim 29 wherein said plurality of coil elements includes a spine coil element and a neck coil element, said plurality of input ports including:

(a) a first input port for receiving a spine signal from said spine coil element; and

(b) a second input port for receiving a neck signal from said neck coil element;

wherein in a sixth of said operational modes said interface circuit interconnects (i) said first input port to a first of said output ports thereby allowing said spine signal to be applied to said first output port; and (ii) said second input port to a second of said output ports thereby allowing said first neck signal to be applied to said second output port.

35. (New) The method recited in claim 29 further comprising the step of disabling said coil elements that are unused in accordance with said operational mode currently selected.

36. (New) The method recited in claim 29 wherein the step of remotely configuring said interface circuit comprises adjusting a state of at least one PIN diode switch so as to switch said phased array coil system between said operational modes.

37. (New) The method recited in claim 29 wherein the step of remotely configuring said interface circuit is carried out by using at least one combiner circuit for remotely switching said phased array coil system between said operational modes, said combiner circuit comprising at least one remotely operable PIN diode switch and a 90 degree phase shifting circuit.